CLAIMS

1. Device for measuring physical properties of the tympanic membrane (TM), comprising an elongated probe (12) with a distal end (15) for inspection of the ear, wherein a plurality of optical fibres is arranged in said elongated probe *characterised* in

that the plurality of fibres includes either a first set of fibres (21) for conveying light from a light source to said distal end of said probe and a second set of fibres (22) for conveying light reflected from the tympanic membrane in front of said distal end to a first detector means (23), or a set of fibres both for conveying light from a light source to said distal end of said probe and for conveying light reflected from the tympanic membrane in front of said distal end to a first detector means (23),

that said first detector means (23) is designed for measuring the intensity of light reflected from the tympanic membrane.

2. Device in accordance with claim 1, wherein said first detector means (23) is a single detector for detecting the light intensity at selected wavelengths or at a spectrum of wavelengths, that is connected to a signal processor (24) provided in a control apparatus (17), said signal processor (24) being configured to apply an erythema detection algorithm on data acquired from said first detector means (23).

3. Device in accordance with claim 2, wherein said erythema detection algorithm utilizes the fact that the photon absorption in the vicinity of the Soret band and the Q band of various blood chromophores is different in erythematous and in normal tissue.

4. Device in accordance with claim 1, wherein said first detector means (23) comprises at least two separate detectors, a first detector having a peak

sensitivity at 650 nm and a second detector having a peak sensitivity at 576 nm.

5. Device in accordance with claim 4, wherein said first detector means (23) comprises at five separate detectors, a first detector having a peak sensitivity around 650 nm, a second detector having a peak sensitivity around 460 nm, a third detector having a peak sensitivity around 490 nm, a fourth detector having a peak sensitivity around 542 nm, and a fifth detector having a peak sensitivity around 576 nm.

6. Device in accordance with claim 1, wherein the plurality of fibres includes a first set of illumination fibres (29), each of said illumination fibres being connected in a first end to one of a plurality of individually controllable light sources (27), and a second set of detecting fibres (30), said second set of detecting fibres being connected in a first end to individual detectors (28), said first set of illumination fibres (29) and said second set of detecting fibres (30), wherein said individually controllable light sources (27) are connected to a control unit (31) arranged to switch on said individually controllable light sources (27) in a sequence and wherein said individual detectors (28) are connected to said signal processor (24) for conveying signals responsive to the intensity of incident light reflected from the tympanic membrane.

7. Device in accordance with claim 6 where first set of illumination fibres (29) and said second set of detecting fibres (30) are equidistantly distributed in two parallel or concentric arrays in the distal end (15), or where first set of illumination fibres (29) and said second set of detecting fibres (30) are interleaved at the distal end (15).

8. Device in accordance with claim 6, wherein said first set of illumination fibres (29) is arranged to direct emitted light in the form of a line on to a target surface.

9. Device in accordance with claim 6, wherein a memory unit (46) is provided for storing signals responsive to the intensity of incident light reflected from a plurality of bodies having different and specified concave and convex surfaces together with the corresponding surface data, and wherein said control unit (31) is designed for comparing said stored signals with signals obtained from a tympanic membrane and electing the surface having a correspondence with the signals obtained from a tympanic membrane.

10. Device in accordance with claim 1, wherein said first set of fibres (21) for conveying light from a light source to said distal end of said probe and said second set of fibres (22) for conveying light reflected from the tympanic membrane in front of said distal end to a first detector means (23) are arranged along a circular line and wherein an ocular channel (35) is arranged radially within said circular line.

11. Device in accordance with claim 9, wherein a separate optical fibre, or set of fibres, (26') is arranged on either side of said ocular channel (35) diametrically opposed to each other for directing light towards the tympanic membrane and for producing visual reference points on the tympanic membrane.

12. Device in accordance with claim 6, wherein said first set of fibres (21) is distributed in a first semicircular section (36) in the distal end (15) together with an ocular channel (35) and wherein said second set of fibres (22) is distributed in a second semicircular section (37) in the distal end (15) together with said first set of illumination fibres (29) and said second set of detecting fibres (30).

13. Device in accordance with claim 8, wherein a separate optical fibre, or set of fibres, (26, 26') is operatively connected to a second light source (25) for conveying light that is directed towards target tissue as a visual reference.

14. Device in accordance with claim 1, wherein said probe (12) extends from a vertical grip section (11) and an eyepiece (13) is optically connected to an ocular channel extending through said probe (12).

15. Method for measuring physical properties of the tympanic membrane (TM), including the following steps:

16. Method in accordance with claim 14, also including the following steps:

a) illuminating in sequence individual spots distributed over the tympanic membrane,

b) detecting the intensity of light reflected from the spots of the tympanic membrane and

c) determining the shape of the tympanic membrane by comparing said detected intensities with stored intensities obtained from type bodies having different shapes.